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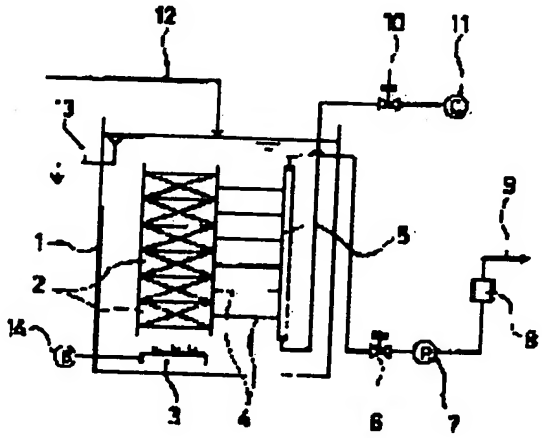
(57)Abstract:

PURPOSE: To extend the filtering continuation time of a membrane module and to reduce the number of times of chemical washing by providing a membrane permeated liquid suction means to the upper part of a water collecting pipe and providing a back pressure washing air pressure introducing means to the lower part thereof.

CONSTITUTION: A membrane permeated liquid suction means comprising a water valve 6, a suction pump 7 and a flowmeter 8 is provided to the upper end of a water collecting pipe 5. A backwashing valve 10 and a compressor 11 are provided to the lower end of the water collecting pipe 5 so as to introduce back pressure washing air into the water collecting pipe 5 under pressure. By this constitution, back pressure washing air is sent from the lower end of the water collecting pipe 5 under pressure to equally supply compressed air to respective membrane modules 2 to increase washing effect. Further, by sucking a membrane permeated liquid from the upper end of the water collecting pipe 5, air at a time of back pressure washing can be easily removed and the lowering of a permeated liquid flow rate caused by residual air can be prevented. Therefore, all of the membrane modules 2 are set to the same state to make it possible to perform the solid-liquid separation of a mixed liquid 13. The lowering of a filtering continuation time is prevented and the number of times of chemical washing can be reduced.



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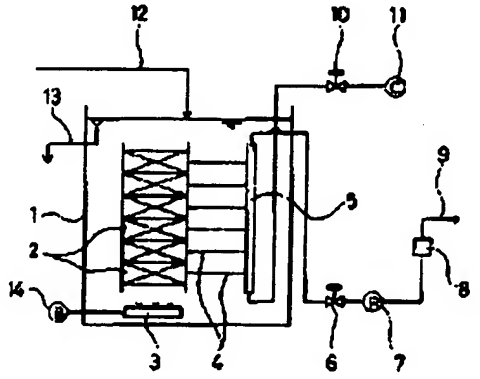
(54)【発明の名称】　固液分離装置

(57)【要約】

【目的】　処理槽内に複数の浸漬型膜モジュールを設け、各膜モジュールを集水管に接続した構成の固液分離装置において、膜モジュールの連続運転時間を長くし、その薬品洗浄回数を低減できるようにする。

【構成】　集水管5の上部に膜透過液9を吸引する吸引ポンプ7を設け、集水管5の下部に逆圧洗浄用の空気を圧入するコンプレッサー11を設ける。

【効果】　各膜モジュールに均等に圧搾空気が供給されるので洗浄効果が増大する。また、逆圧洗浄時の空気が容易に除去されるので残留空気による透過流量の低下が防止される。



1--- 処理槽
2--- 浸漬型膜モジュール
5--- 集水管
9--- 膜透過液
7--- 吸引ポンプ
10--- 逆洗弁
11--- コンプレッサー

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【特許請求の範囲】

【請求項１】　処理槽内に複数の浸漬型膜モジュールを設け．各膜モジュールを集水管に接続して、集水管を通して膜の内側に吸引負圧をかけることにより膜透過液を取り出すように構成された固液分離装置において．集水管の上部に膜透過液を吸引する手段を設け、集水管の下部に逆圧洗浄用の空気を圧入する手段を設けたことを特徴とする固液分離装置。

【請求項２】　膜モジュールを水深に応じて複数の膜モジュール群に分割し、各膜モジュール群に集水管を設けたことを特徴とする請求項１記載の固液分離装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、廃水処理、浄水処理、汚泥濃縮処理などにおいて使用される固液分離装置に関する。

【０００２】

【従来の技術】従来の固液分離装置には、たとえば図２に示したようなものがある。固液分離装置は、微生物処理槽１内に、槽内の被処理水に浸漬して複数の膜モジュール２を一定間隔で並列に設けており．膜モジュール２の下方に散気管３を設けている。膜モジュール２は膜の内側に膜透過液流路を有していて、この膜透過液流路が管４を介して集水管５に接続している。集水管５の下端には通水弁６を介して吸引ポンプ７が接続されていて、吸引ポンプ７によって膜の内側を負圧とすることにより膜透過液９を取り出せるようになっている。また．吸引ポンプ７には流量計８が接続されており、取り出された膜透過液９の流量が測定されるようになっている。集水管５の上端には逆洗弁１０を介してコンプレッサー１１などの空気供給手段が接続されており．この空気供給手段により膜の内側に逆圧洗浄用の空気を供給可能である。処理槽１は．上方より被処理水１２が供給され、槽１の上部から槽内の被処理水と微生物との混合液１３の一部がオーバーフローするように構成されており．散気管３は槽１外のブロワー１４などの空気供給手段に接続されている。

【０００３】上記のような構成の固液分離装置において．処理槽１内に被処理水１２を供給し、かつ通水弁６を開いて吸引ポンプ７で吸引力を作用させる状態において．ブロワー１４より散気管３を通じて空気などの酸素を含有する曝気用気体を吹き込む。すると、混合液１３は酸素が供給されかつ気泡により生起される撹拌流にて撹拌混合され．混合液１３中の被処理水１２は微生物により処理される。また、混合液１３は．散気管３より吹き出される空気などの気泡により上昇流となり．槽１内を循環する間に膜モジュール２により固液分離されて、膜透過液９は管４、次いで集水管５を通り流量計８を経て槽１外へ取り出される。膜モジュール２の膜または濾過材の表面の付着物は槽１内の循環流によって剥離され

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るので、膜モジュール２の目づまりはある程度防止される。

【０００４】そして、定期的に膜モジュール２の逆圧洗浄が行われる。すなわち．通水弁６を閉じるとともに逆洗弁１０を開き．コンプレッサー１１により空気を圧送する。これにより、集水管５、管４を経て膜モジュール２に空気が送られ、その表面に付着した汚泥のケーキ層やゲル層などが除去される。

【０００５】

【発明が解決しようとする課題】しかしながら．上記のような従来の固液分離装置では、集水管の下端から膜透過液を取り出し．集水管の上端から逆圧洗浄用の空気を供給するように構成されているため．逆圧洗浄時の空気が膜モジュールに残留してしまい、固液分離工程に入ったときも抜けにくいため．残留空気によって膜モジュールの濾過性能が妨害される。そのため．膜モジュール間で膜透過液の量に偏りが生じ、早く透過液量の少なくなった膜モジュールに合わせて薬品洗浄することになるので．膜モジュールの濾過継続時間が短くなり、薬品洗浄回数が多くなるという問題がある。

【０００６】本発明は上記問題を解決するもので．膜モジュールの濾過継続時間を長くし、その薬品洗浄回数を低減できるような固液分離装置を提供することを目的とするものである。

【０００７】

【課題を解決するための手段】上記問題を解決するために本発明の固液分離装置は．処理槽内に複数の浸漬型膜モジュールを設け、各膜モジュールを集水管に接続して．集水管を通して膜の内側に吸引負圧をかけることにより膜透過液を取り出すように構成された固液分離装置において、集水管の上部に膜透過液を吸引する手段を設け．集水管の下部に逆圧洗浄用の空気を圧入する手段を設けたものである。

【０００８】また本発明の固液分離装置は、膜モジュールを水深に応じて複数の膜モジュール群に分割し．各膜モジュール群に集水管を設けたものである。

【０００９】

【作用】上記構成により．集水管の下部に逆圧洗浄用の空気を圧入する手段を設けたことで．各膜モジュールに均等に圧搾空気が供給され．洗浄効果が増大する。また．集水管の上部に膜透過液を吸引する手段を設けたことにより、逆圧洗浄時の空気が容易に除去され．残留空気による透過流量の低下を防ぐことができる。

【００１０】

【実施例】以下．本発明の一実施例の固液分離装置を図１を参照しながら説明する。この固液分離装置は上で説明した従来の固液分離装置とほぼ同じなので、同一の構成および同一の作用を有する部材に同じ符号を付してその説明を省略する。ここで．本発明の固液分離装置が従来の固液分離装置と異なるのは、膜透過液を吸引する手

段を集水管５の上端に設け．逆圧洗浄用の空気を圧入する手段を集水管５の下端に設けた点である。すなわち、通水弁６と吸引ポンプ７と流量計８とを集水管５の上端に設け、逆洗弁１０とコンプレッサー１１とを集水管５の下端に設けた。

【００１１】この構成により、逆圧洗浄用の空気が集水管５の下端より圧送されるため、各膜モジュール２に均等に圧搾空気が供給されることになり．洗浄効果が増大する。また、膜透過液９が集水管５の上端から吸引されるため、逆圧洗浄時の空気が容易に除去されることになり．残留空気による透過流量の低下を防ぐことができる。この結果．膜モジュール２を全て同じ状態として混合液１３の固液分離を行うことができるので、早く透過液量が少なくなった膜モジュール２に合わせて薬品洗浄することに基づく連過継続時間の低下を防止でき．膜モジュール２の薬品洗浄回数を低減できる。

【００１２】上記の構成に代えて、膜モジュールを水深に応じて複数の膜モジュール群に分割し、それぞれの膜モジュール群に集水管を設けることにより、各膜モジュールにさらに均等に圧搾空気を供給し．かつこの空気を容易に除去することができる。

【００１３】処理槽は上で説明に用いた浸生物処理槽に限定されることなく使用でき、膜モジュールも限外連過膜を用いた膜モジュール．セラミックチューブなど種々のものを使用できる。

【００１４】

【発明の効果】以上のように本発明によれば、逆圧洗浄用の空気を圧入する手段を集水管の下部に設けて．圧搾＊

＊空気が各膜モジュールに均等に供給される構成としたことにより、膜モジュールの洗浄効果が増大する。また、膜透過液を吸引する手段を集水管の上部に設けて．逆圧洗浄時の空気が容易に除去される構成としたことにより．残留空気による透過流量の低下という問題を回避できる。これにより、膜モジュールを全て同じ状態として連過工程を行うことができ．早く膜透過液量が少なくなった膜モジュールに合わせて薬品洗浄する必要がなくなる。これらの結果、全体として膜モジュールの連過継続時間が長くなるので、その薬品洗浄回数を低減できる。

【００１５】また、膜モジュールを水深に応じて複数の膜モジュール群に分割し．それぞれの膜モジュール群に集水管を設けることにより．各膜モジュールにさらに均等に圧搾空気を供給し、かつこの空気を容易に除去することができる。

【図面の簡単な説明】

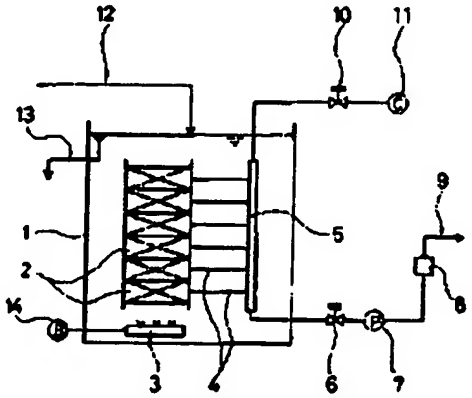
【図１】本発明の一実施例の固液分離装置の全体構成を示した説明図である。

【図２】従来例の固液分離装置の全体構成を示した説明図である。

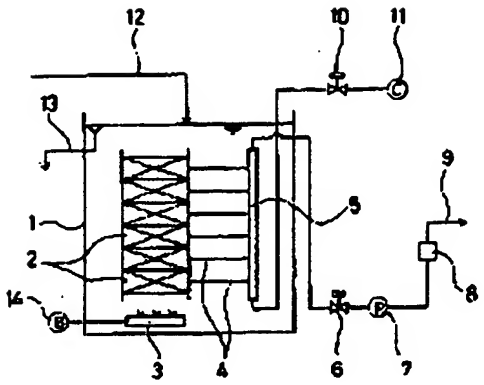
【符号の説明】

1　処理槽
2　浸漬型膜モジュール
5　集水管
6　通水弁
7　吸引ポンプ
10　逆洗弁
11　コンプレッサー

【図２】



【図１】



1--- 処理槽
2--- 浸漬型膜モジュール
5--- 集水管
6--- 透水弁
7--- 吸引ポンプ
10--- 逆洗弁
11--- コンプレッサー

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CLAIMS

[Claim(s)]
[Claim 1] The solid-liquid separator characterized by to have prepared two or more dipping former membrane modules in the processing tub, to have connected each membrane module to catchment tubing, to have formed a means attract film transparency liquid in the upper part of catchment tubing in the solid-liquid separator constituted so that film transparency liquid might be taken out by applying suction negative pressure inside membranous through catchment tubing, and to establish a means press the air for back-pressure washing fit in the lower part of catchment tubing.
[Claim 2] The solid-liquid separator according to claim 1 characterized by having divided the membrane module into two or more membrane module groups according to depth of water, and forming catchment tubing in each membrane module group.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the solid-liquid separator used in waste water treatment, water purification processing, sludge concentration processing, etc.
[0002]
[Description of the Prior Art] There is a thing as shown in drawing 2 in the conventional solid-liquid separator. In the microorganism treatment tub 1, the solid-liquid separator was immersed in the processed water in a tub, has formed two or more membrane modules 2 in juxtaposition at fixed spacing, and has formed the powder trachea 3 under the membrane module 2. The membrane module 2 has the film transparency liquid flow channel inside membranous, and this film transparency liquid flow channel has connected it to the catchment tubing 5 through tubing 4. The suction pump 7 is connected to the lower limit of the catchment tubing 5 through the water flow valve 6, and film transparency liquid 9 can be taken out now by making the membranous inside into negative pressure with a suction pump 7. Moreover, the flowmeter 8 is connected to the suction pump 7, and the flow rate of the taken-out film transparency liquid 9 is measured. Air supply means, such as a compressor 11, are connected to the upper limit of the catchment tubing 5 through the reversible valve 10, and the air for back pressure washing can be supplied inside membranous with this air supply means. Processed water 12 is supplied from the upper part, the processing tub 1 is constituted so that a part of mixed liquor 13 of the processed water in a tub and a microorganism may overflow from the upper part of a tub 1, and the powder trachea 3 is connected to air supply means, such as the blower 14 besides a tub 1.
[0003] In the solid-liquid separator of the above configurations, the gas for aeration which contains oxygen, such as air, through the powder trachea 3 from a blower 14 is blown in the condition of supplying processed water 12 in the processing tub 1, and opening the water flow valve 6, and making a suction force acting with a suction pump 7. Then, stirring mixing of the mixed liquor 13 is carried out in the stirring style which oxygen is supplied and occurs with air bubbles, and the processed water 12 in mixed liquor 13 is processed by the microorganism. moreover, while mixed liquor 13 serves as a upflow with air bubbles, such as air which blows off from the powder trachea 3, and circulating through the inside of a tub 1, solid liquid separation is carried out with a membrane module 2 -- having -- film transparency liquid 9 -- tubing 4 -- subsequently -- the catchment tubing 5 -- a passage -- a flowmeter 8 -- pass -- it is taken out out of a tub 1. Since the affix of the film of a membrane module 2 or the front face of filter media exfoliates by the circulating flow in a tub 1, the loading of a membrane module 2 is prevented to some extent.
[0004] And back pressure washing of a membrane module 2 is performed periodically. That is, while closing the water flow valve 6, a reversible valve 10 is opened, and air is fed by the compressor 11. Thereby, air is sent to a membrane module 2 through the catchment tubing 5 and tubing 4, and a cake layer, a gel layer, etc. of the sludge adhering to the front face are removed.
[0005]
[Problem(s) to be Solved by the Invention] However, in the above conventional solid-liquid separators, film transparency liquid is taken out from the lower limit of catchment tubing, and since it is hard to escape also

when the air at the time of back pressure washing remains to a membrane module and it goes into a solid-liquid-separation process, since it is constituted so that the air for back pressure washing may be supplied from the upper limit of catchment tubing, the filtration efficiency of a membrane module is blocked with residual air. Therefore, since chemical washing will be carried out according to the membrane module whose transparency volume the bias arose in the amount of film transparency liquid between membrane modules, and decreased early, the filtration duration of a membrane module becomes short and there is a problem that the count of chemical washing increases.

[0006] This invention solves the above-mentioned problem, filtration duration of a membrane module is lengthened, and it aims at offering the solid-liquid separator which can reduce the count of chemical washing.

[0007]

[Means for Solving the Problem] In order to solve the above-mentioned problem, the solid-liquid separator of this invention prepares two or more dipping former membrane modules in a processing tub, and connects each membrane module to catchment tubing, a means attract film transparency liquid forms in the upper part of catchment tubing in the solid-liquid separator constituted so that film transparency liquid might be taken out by applying suction negative pressure inside membranous through catchment tubing, and a means press the air for back-pressure washing fit in the lower part of catchment tubing prepares.

[0008] Moreover, the solid-liquid separator of this invention divides a membrane module into two or more membrane module groups according to depth of water, and forms catchment tubing in each membrane module group.

[0009]

[Function] By having established a means to press the air for back pressure washing fit in the lower part of catchment tubing, by the above-mentioned configuration, a compressed air is equally supplied to each membrane module, and a cleaning effect increases. Moreover, by having formed a means to attract film transparency liquid in the upper part of catchment tubing, the air at the time of back pressure washing is removed easily, and can prevent the fall of a transparency flow rate with residual air.

[0010]

[Example] Hereafter, the solid-liquid separator of one example of this invention is explained, referring to drawing 1 . Since this solid-liquid separator is almost the same as the conventional solid-liquid separator explained in the top, the same sign as the member which has the same configuration and the same operation is attached, and that explanation is omitted. Here, that the solid-liquid separator of this invention differs from the conventional solid-liquid separator is the point of having formed a means to attract film transparency liquid in the upper limit of the catchment tubing 5, and having formed a means to press the air for back pressure washing fit in the lower limit of the catchment tubing 5. That is, the water flow valve 6, the suction pump 7, and the flowmeter 8 were formed in the upper limit of the catchment tubing 5, and the reversible valve 10 and the compressor 11 were formed in the lower limit of the catchment tubing 5.

[0011] Since the air for back pressure washing is fed from the lower limit of the catchment tubing 5 by this configuration, a compressed air will be equally supplied to each membrane module 2 by it, and a cleaning effect increases by it. Moreover, since film transparency liquid 9 is attracted from the upper limit of the catchment tubing 5, the air at the time of back pressure washing will be removed easily, and can prevent the fall of a transparency flow rate with residual air. Consequently, since solid liquid separation of mixed liquor 13 can be altogether performed by making a membrane module 2 into the same condition, the fall of the filtration duration based on carrying out chemical washing according to the membrane module 2 whose transparency volume decreased early can be prevented, and the count of chemical washing of a membrane module 2 can be reduced.

[0012] By replacing with the above-mentioned configuration, dividing a membrane module into two or more membrane module groups according to depth of water, and forming catchment tubing in each membrane module group, a compressed air can be supplied to each membrane module still more equally, and the air of a parenthesis can be removed easily.

[0013] A processing tub can be used without being limited to the microorganism treatment tub used for

explanation in the top, and a membrane module can also use various things, such as a membrane module using ultrafiltration membrane, and a ceramic tube.

[0014]

[Effect of the Invention] According to this invention, the cleaning effect of a membrane module increases as mentioned above by having formed a means to press the air for back pressure washing fit in the lower part of catchment tubing, and having considered as the configuration by which a compressed air is equally supplied to each membrane module. Moreover, the problem of the fall of a transparency flow rate with residual air is avoidable by having formed a means to attract film transparency liquid in the upper part of catchment tubing, and having considered as the configuration from which the air at the time of back pressure washing is removed easily. It becomes unnecessary thereby, to be able to perform a filtration process and to carry out chemical washing according to the membrane module whose film transparency volume decreased early by making all membrane modules into the same condition. Since the filtration duration of a membrane module becomes long as a whole these results, the count of chemical washing can be reduced.

[0015] Moreover, by dividing a membrane module into two or more membrane module groups according to depth of water, and forming catchment tubing in each membrane module group, a compressed air can be supplied to each membrane module still more equally, and the air of a parenthesis can be removed easily.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention relates to the solid-liquid separator used in waste water treatment, water purification processing, sludge concentration processing, etc.

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PRIOR ART

[Description of the Prior Art] There is a thing as shown in drawing 2 in the conventional solid-liquid separator. In the microorganism treatment tub 1, the solid-liquid separator was immersed in the processed water in a tub, has formed two or more membrane modules 2 in juxtaposition at fixed spacing, and has formed the powder trachea 3 under the membrane module 2. The membrane module 2 has the film transparency liquid flow channel inside membranous, and this film transparency liquid flow channel has connected it to the catchment tubing 5 through tubing 4. The suction pump 7 is connected to the lower limit of the catchment tubing 5 through the water flow valve 6, and film transparency liquid 9 can be taken out now by making the membranous inside into negative pressure with a suction pump 7. Moreover, the flowmeter 8 is connected to the suction pump 7, and the flow rate of the taken-out film transparency liquid 9 is measured. Air supply means, such as a compressor 11, are connected to the upper limit of the catchment tubing 5 through the reversible valve 10, and the air for back pressure washing can be supplied inside membranous with this air supply means. Processed water 12 is supplied from the upper part, the processing tub 1 is constituted so that a part of mixed liquor 13 of the processed water in a tub and a microorganism may overflow from the upper part of a tub 1, and the powder trachea 3 is connected to air supply means, such as the blower 14 besides a tub 1.
[0003] In the solid-liquid separator of the above configurations, the gas for aeration which contains oxygen, such as air, through the powder trachea 3 from a blower 14 is blown in the condition of supplying processed water 12 in the processing tub 1, and opening the water flow valve 6, and making a suction force acting with a suction pump 7. Then, stirring mixing of the mixed liquor 13 is carried out in the stirring style which oxygen is supplied and occurs with air bubbles, and the processed water 12 in mixed liquor 13 is processed by the microorganism. moreover, while mixed liquor 13 serves as a upflow with air bubbles, such as air which blows off from the powder trachea 3, and circulating through the inside of a tub 1, solid liquid separation is carried out with a membrane module 2 -- having -- film transparency liquid 9 -- tubing 4 -- subsequently -- the catchment tubing 5 -- a passage -- a flowmeter 8 -- pass -- it is taken out out of a tub 1. Since the affix of the film of a membrane module 2 or the front face of filter media exfoliates by the circulating flow in a tub 1, the loading of a membrane module 2 is prevented to some extent.
[0004] And back pressure washing of a membrane module 2 is performed periodically. That is, while closing the water flow valve 6, a reversible valve 10 is opened, and air is fed by the compressor 11. Thereby, air is sent to a membrane module 2 through the catchment tubing 5 and tubing 4, and a cake layer, a gel layer, etc. of the sludge adhering to the front face are removed.

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EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, the cleaning effect of a membrane module increases as mentioned above by having formed a means to press the air for back pressure washing fit in the lower part of catchment tubing, and having considered as the configuration by which a compressed air is equally supplied to each membrane module. Moreover, the problem of the fall of a transparency flow rate with residual air is avoidable by having formed a means to attract film transparency liquid in the upper part of catchment tubing, and having considered as the configuration from which the air at the time of back pressure washing is removed easily. It becomes unnecessary thereby, to be able to perform a filtration process and to carry out chemical washing according to the membrane module whose film transparency volume decreased early by making all membrane modules into the same condition. Since the filtration duration of a membrane module becomes long as a whole these results, the count of chemical washing can be reduced.
[0015] Moreover, by dividing a membrane module into two or more membrane module groups according to depth of water, and forming catchment tubing in each membrane module group, a compressed air can be supplied to each membrane module still more equally, and the air of a parenthesis can be removed easily.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the above conventional solid-liquid separators, film transparency liquid is taken out from the lower limit of catchment tubing, and since it is hard to escape also when the air at the time of back pressure washing remains to a membrane module and it goes into a solid-liquid-separation process, since it is constituted so that the air for back pressure washing may be supplied from the upper limit of catchment tubing, the filtration efficiency of a membrane module is blocked with residual air. Therefore, since chemical washing will be carried out according to the membrane module whose transparency volume the bias arose in the amount of film transparency liquid between membrane modules, and decreased early, the filtration duration of a membrane module becomes short and there is a problem that the count of chemical washing increases.
[0006] This invention solves the above-mentioned problem, filtration duration of a membrane module is lengthened, and it aims at offering the solid-liquid separator which can reduce the count of chemical washing.

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MEANS

[Means for Solving the Problem] In order to solve the above-mentioned problem, the solid-liquid separator of this invention prepares two or more dipping former membrane modules in a processing tub, and connects each membrane module to catchment tubing, a means attract film transparency liquid forms in the upper part of catchment tubing in the solid-liquid separator constituted so that film transparency liquid might be taken out by applying suction negative pressure inside membranous through catchment tubing, and a means press the air for back-pressure washing fit in the lower part of catchment tubing prepares.
[0008] Moreover, the solid-liquid separator of this invention divides a membrane module into two or more membrane module groups according to depth of water, and forms catchment tubing in each membrane module group.

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OPERATION

[Function] By having established a means to press the air for back pressure washing fit in the lower part of catchment tubing, by the above-mentioned configuration, a compressed air is equally supplied to each membrane module, and a cleaning effect increases. Moreover, by having formed a means to attract film transparency liquid in the upper part of catchment tubing, the air at the time of back pressure washing is removed easily, and can prevent the fall of a transparency flow rate with residual air.

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EXAMPLE

[Example] Hereafter, the solid-liquid separator of one example of this invention is explained, referring to drawing 1 . Since this solid-liquid separator is almost the same as the conventional solid-liquid separator explained in the top, the same sign as the member which has the same configuration and the same operation is attached, and that explanation is omitted. Here, that the solid-liquid separator of this invention differs from the conventional solid-liquid separator is the point of having formed a means to attract film transparency liquid in the upper limit of the catchment tubing 5, and having formed a means to press the air for back pressure washing fit in the lower limit of the catchment tubing 5. That is, the water flow valve 6, the suction pump 7, and the flowmeter 8 were formed in the upper limit of the catchment tubing 5, and the reversible valve 10 and the compressor 11 were formed in the lower limit of the catchment tubing 5.
[0011] Since the air for back pressure washing is fed from the lower limit of the catchment tubing 5 by this configuration, a compressed air will be equally supplied to each membrane module 2 by it, and a cleaning effect increases by it. Moreover, since film transparency liquid 9 is attracted from the upper limit of the catchment tubing 5, the air at the time of back pressure washing will be removed easily, and can prevent the fall of a transparency flow rate with residual air. Consequently, since solid liquid separation of mixed liquor 13 can be altogether performed by making a membrane module 2 into the same condition, the fall of the filtration duration based on carrying out chemical washing according to the membrane module 2 whose transparency volume decreased early can be prevented, and the count of chemical washing of a membrane module 2 can be reduced.
[0012] By replacing with the above-mentioned configuration, dividing a membrane module into two or more membrane module groups according to depth of water, and forming catchment tubing in each membrane module group, a compressed air can be supplied to each membrane module still more equally, and the air of a parenthesis can be removed easily.
[0013] A processing tub can be used without being limited to the microorganism treatment tub used for explanation in the top, and a membrane module can also use various things, such as a membrane module using ultrafiltration membrane, and a ceramic tube.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view having shown the whole solid-liquid-separator configuration of one example of this invention.
[Drawing 2] It is the explanatory view having shown the whole solid-liquid-separator configuration of the conventional example.
[Description of Notations]
1 Processing Tub
2 Dipping Former Membrane Module
5 Catchment Tubing
6 Water Flow Valve
7 Suction Pump
10 Reversible Valve
11 Compressor

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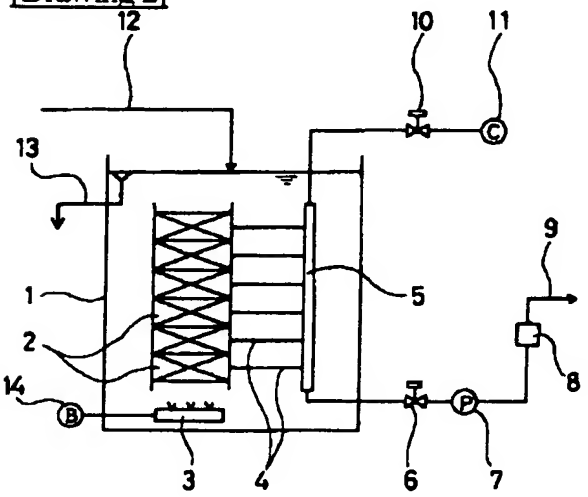
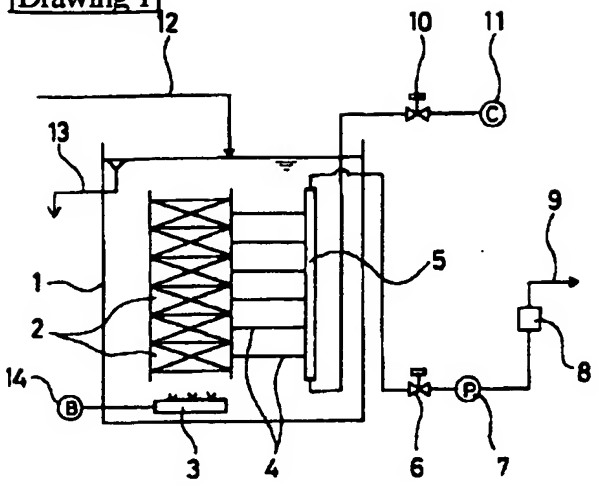
DRAWINGS

[Drawing 2]



[Drawing 1]



1--- 処理槽
2--- 浸漬型膜モジュール
5--- 集水管
6--- 通水弁
7--- 吸引ポンプ
10--- 逆洗弁
11--- コンプレッサー

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